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(54) PRODUCTION OF MAGNETIC COATING MATERIAL, AND MAGNETIC RECORDING MEDIUM

(57)Abstract:
PROBLEM TO BE SOLVED: To produce a magnetic coating material suitable for high-density recording by using a medium for dispersion having an average particle size of a specified value or lower and by dispersing so as to satisfy a specific relation in the case when magnetic particles are dispersed in a dispersion liquid containing a binder with a medium- dispersing machine.
SOLUTION: In this method for producing a magnetic coating material, a medium for dispersion having an average particle size of 1 mm or lower is used and magnetic particles are dispersed so as to satisfy the relation represented by the formula [wherein η is the viscosity (cP) of the magnetic coating material at 20 rpm with a BL viscometer; m is the wt. (g) of one particle of the medium for dispersion represented by the average particle size of the medium; υ is the operating peripheral speed (cm/sec) of the medium-dispersing machine; ρ a is the specific gravity (g/cc) of the medium; and ρb is the specific gravity of the magnetic coating material]. Preferably, a ceramic or zirconia is used as the medium. By finely pulverizing a magnetic powder and imparting high magnetic energy to it, the dispersibility of the magnetic powder in the dispersion liquid can be further improved though the cohesive power of each particle becomes strong.

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CLAIMS

[Claim(s)]
[Claim 1] The manufacture approach of the magnetic coating which is the approach of manufacturing a magnetic coating by distributing a magnetic particle in the dispersion liquid containing a binder using a medium disperser, and is characterized by distributing so that mean particle diameter may use the medium for distribution 1mm or less and the following formula may be satisfied.
Viscosity of the magnetic coating at the time of 20rpm of a 0.5 <=eta/(mxupsilon 2 (rhoa-rhob)) <=40 eta:BL mold viscometer (cps)
m: Weight of one medium for distribution represented with the mean particle diameter of the medium for distribution (g)
upsilon: Operation peripheral speed of a medium disperser (cm/second)
rhoa: Specific gravity of the medium for distribution (g/cc)
rhob: Specific gravity of a magnetic coating (g/cc)
[Claim 2] The manufacture approach of a magnetic coating according to claim 1 that said medium for distribution is a ceramic.
[Claim 3] The manufacture approach of a magnetic coating according to claim 1 that said medium for distribution is a zirconia [claim 4] The magnetic-recording medium manufactured by applying the magnetic coating by the manufacture approach according to claim 1, 2, or 3 to a base material.

[Translation done.]

DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the magnetic-recording medium which raised the manufacture approach of a magnetic coating of having improved productivity, such as storage stability, especially and magnetic properties, and a magnetic parametric performance about the magnetic-recording medium manufactured using the method of mixing a magnetic coating constituent efficiently with the medium for distribution, distributing using a medium disperser, and manufacturing a magnetic coating, and its magnetic coating.
[0002]
[Description of the Prior Art] Generally, a magnetic coating supplies the magnetic coating constituent which consists of magnetic ****, a binder component, an organic solvent, and other need components to the medium distributed mill which ****(ed) media for distribution, such as a glass bead, in the mixing chamber, and is manufactured through processes, such as carrying out forcible stirring, with the medium for distribution with the stirring equipment installed inside in the mixing chamber.
[0003] On the other hand, as for the magnetic-recording medium used for video, audio equipment, or a computer, high recording density-ization progresses increasingly in recent years, for the reason, record wavelength is short, recording track width of face is narrow, and record-medium thickness is going in the direction which makes it thin and makes the minimum record unit small. Magnetic **** uses the ferromagnetic big metal-powder sheep of magnetic energy increasingly by the particle for the management. However, magnetic powder had the trouble that neither dispersibility required in order to obtain the high playback output and the good S/N ratio of short wavelength record, nor surface smooth nature was fully obtained, by atomization or the manufacture approach of a magnetic coating which the cohesive force of each particle becomes strong, consequently uses a glass bead as a medium for distribution, so that high magnetic energy is formed.
[0004] For this reason, the approach specific gravity uses ceramic beads, such as a big zircon bead and zirconia beads, as a medium for distribution as compared with a glass bead is proposed in JP,60-211637,A, JP,64-57422,A, JP,1-290122,A, etc.
[0005]
[Problem(s) to be Solved by the Invention] However, when a ceramic bead with comparatively large specific gravity, especially zirconia beads (specific gravity of 6g/cc) were used as a medium for distribution, since specific gravity was too large, there was a problem which magnetic powder is broken [problem] and degrades a magnetic parametric performance. In order to avoid this problem, make viscosity of dispersion liquid high, or operate the peripheral speed of the stirring equipment of a disperser rather than conditions conventionally at a low speed, and the impulse force at the time of the collision between the media for distribution is made to ease, and if it is ****, there is nothing. However, if the viscosity of dispersion liquid is raised, the new problem that it becomes difficult to coat a base material with a magnetic coating itself will arise. Moreover, if peripheral speed of stirring equipment is made low, the problem that it becomes difficult to fully stir the medium for distribution, and it becomes difficult to obtain desired degree of dispersion will arise.
[0006] On the other hand, if what also has the path of the medium for distribution to be used smaller when atomization of magnetic powder progresses is not used, it will become difficult to obtain sufficient degree of dispersion. However, if the path of the medium for distribution becomes small, the weight per medium becomes small, sufficient collision force will not be able to be acquired depending on the case, but it will be difficult to obtain sufficient degree of dispersion.
[0007] This invention cancels the above troubles in the manufacture approach of the conventional magnetic coating, and when atomization and the magnetic powder formed into high magnetic energy are used, it aims at manufacturing using the manufacture approach that the magnetic coating which fits high density record by the medium for distribution of a minor diameter can be manufactured, and its magnetic coating, by high specific gravity, raising magnetic

properties and a magnetic parametric performance, and offering the possible magnetic-recording medium of high density record.
[0008]
[Means for Solving the Problem] In order to attain the above-mentioned technical problem, this invention person finds out wholeheartedly that it is effective to set up the peripheral speed of the stirring equipment installed inside the weight of the medium for distribution to be used, dispersion-liquid viscosity, and a medium disperser as a result of research etc. so that a predetermined formula may be satisfied, and this invention is made based on this knowledge.
[0009] That is, by distributing a magnetic particle in the dispersion liquid containing a binder using a medium disperser, the manufacture approach of the magnetic coating of this invention is an approach of manufacturing a magnetic coating, and is characterized by distributing so that mean particle diameter may use the medium for distribution 1mm or less and the following formula (1) may be satisfied.
[0010]
0.5 <=eta/(mxupsilon 2 (rhoa-rhob)) <=40 (1)
[0011] Viscosity of the magnetic coating at the time of 20rpm of an eta:BL mold viscometer (cps)
[0012] m: Weight of one medium for distribution represented with the mean particle diameter of the medium for distribution (g)
[0013] upsilon: Operation peripheral speed of a medium disperser (cm/second)
[0014] rhoa: Specific gravity of the medium for distribution (g/cc)
[0015] rhob: Specific gravity of a magnetic coating (g/cc)
[0016] In an above-mentioned formula (1), viscosity eta is obtained by the following measuring methods. For example, the Brookfield viscometer (BL mold) by TOKIMEC, INC. is used, and the rotational frequency of Rota computes the viscosity of 1 minute after by 20rpm. Viscosity serves as a value which multiplied the constant decided by Rota to be used and the rotational frequency like the following formula (2) by viscometer indicated value.
[0017]
Viscosity eta(cps) = constant x viscometer indicated value (2)
[0018] Moreover, weight m of the medium for distribution is the weight (g) of one medium for distribution represented with the mean particle diameter of the medium for distribution, and it can specifically ask for it by the following formulas (3).
[0019]
m=(4/3) pir3rhoa (3)
Here, r (cm) is 1/2 of the mean particle diameter of the medium for distribution.
[0020] Moreover, the operation peripheral speed upsilon of a medium disperser expresses the peripheral speed of the point of the pin attached in stirring shafts, such as the below-mentioned pin mold mill.
[0021] When the value of the middle term of an above-mentioned formula (1) exceeds 40, from the surface glossiness of the paint film [KYASUTENGU / paint film], distribution looks good, but if it sees in micro, the small micro floc by which even one magnetic one-piece powder is not distributed will come to exist, and it will become in the direction to which the dispersibility of the magnetic powder in dispersion liquid falls. For this reason, when using the magnetic coating containing the magnetic powder which atomized as an object for record media with short record wavelength, before applying, it is necessary to remove micro floc with a filter, and if the aperture of a filter which filters a magnetic coating is made small in order to remove small micro floc, a filter life (time amount until it becomes impossible for a filter to start and filter blinding) will become short, and the trouble that productivity does not improve will arise. Moreover, if the value of the middle term of a formula (1) becomes large too much, the big floc in addition to micro floc exists [come] and is not desirable.
[0022] Magnetic powder is it easy to be distributed that the value of the middle term of a formula (1) is 40 or less to every piece, small micro floc becomes impossible easily, and dispersibility becomes good. Thereby, a filter life also becomes long and its productivity improves.
[0023] On the other hand, if the value of the middle term of a formula (1) becomes smaller than 0.5, it will become easy to generate breakage of magnetic powder. Re-condensation of magnetic powder becomes easy to take place under the effect of the piece of grinding magnetism powder made detailed for this breakage, the storage stability of a magnetic coating deteriorates, and it further becomes easy to produce variation in magnetic properties or a magnetic parametric performance in the magnetic-recording medium using this magnetic coating.
[0024] The storage stability of an above-mentioned magnetic coating improves that the value of the middle term of a formula (1) is 0.5 or more, and magnetic properties and a magnetic parametric performance stabilize and improve in the magnetic-recording medium using this magnetic coating.
[0025] Moreover, a ceramic or a zirconia can be used as said medium for distribution. When magnetic powder forms atomization and quantity magnetic energy, even if the cohesive force of each particle becomes strong, when specific gravity uses media for distribution, such as a big ceramic bead and zirconia beads, as compared with a glass bead, the

dispersibility of the magnetic powder in dispersion liquid is further improvable.
[0026]
[Embodiment of the Invention] Hereafter, it explains in full detail further according to the gestalt of operation of this invention. Although an example of the production process of the magnetic coating by the gestalt of this operation to drawing 1 is shown, this invention is not limited to this production process.
[0027] First, the binders (binder) 11, such as a resin ingredient, are dissolved in a solvent 12, and the binder solution 16 is created (S01). On the other hand, a solvent 12, the magnetic powder 13, a dispersant 14, an additive 15, and the binder solution 16 are mixed, it supplies in ** SSERU of the medium distributed mill which carried out the predetermined fill injection of the medium for distribution beforehand, and while churning equipments, such as a disk for stirring of a large number installed inside ** SSERU, a patagium agitator body, or a pin for stirring, rotate with a predetermined peripheral speed, mixing and distributed processing are performed (S02). In addition, it is desirable to perform kneading processing, in order to often mix magnetic powder and a binder solution in the state of hyperviscosity before distributed processing, and to perform churning processing which adds a solvent, and agitates and dilutes it to what carried out this kneading processing further.
[0028] Next, after performing the let down which adds a solvent to the dispersion liquid which perform mixing and distributed processing as mentioned above, and by which the magnetic powder 13 was distributed if needed, and lowers viscosity (S03), it can filter with a filter (S04) and a magnetic coating can be manufactured.
[0029] Apply the above magnetic coatings to a thin base material (S05), and magnetic field orientation processing in which the directivity of magnetic powder is arranged by passing the inside of a magnetic field in the condition that the fluidity fully remains is performed (S06). After performing desiccation processing which a solvent is evaporated and is made into a solid state (S07), a magnetic-recording medium can be manufactured by what after treatment, such as calender surface treatment which improves front-face nature and raises the plugging condition of magnetic powder, and decision processing to a desired configuration, is performed for (S08). In addition, a back coat layer may be prepared in the opposite side which formed the magnetic coating in the magnetic-recording medium if needed. Moreover, with calender surface treatment, it can carry out by passing between the metal rolls and elastic rolls which have been arranged by turns in the record medium, where predetermined temperature and a predetermined pressure are applied.
[0030] Although a pin mold mill and a sand mill can be mentioned to representation as an above-mentioned medium disperser, drawing 2 explains this pin mold mill. The pin mold mill 1 as a medium disperser is equipped with the container (bessel) 2 of the shape of a longwise cylinder which contains the dispersion liquid of a magnetic coating, the pin 3 of a large number fixed so that it might project to radial at the internal surface of a container 2, the revolving shaft 4 by which many 2nd pin 5 is connected and a rotation drive is carried out by the motor (illustration abbreviation), the inlet port 6 of dispersion liquid established in the container 2, and the outlet 7 of dispersion liquid.
[0031] The 2nd pin 5 is formed in radial [of a revolving shaft 4], and the 2nd pin 5 and the pin 3 which projected from the wall of a container 2 are constituted so that it may lap in the vertical direction partially by turns radial, where spacing is set. The rotational speed in the tip of the 2nd pin 5 established in the revolving shaft 4 as this churning equipment is the peripheral speed upsilon of churning equipment.
[0032] The dispersion liquid (magnetic coating) by which distributed processing is made are supplied in a container 2 from an inlet port 6, and between the 2nd rotating pin 5 and the fixed pins 3 is discharged from an outlet 7, while the medium for distribution in the bessel of a disperser (bead) receives distributed processing with a passage. In addition, in order to acquire sufficient dispersibility, the discharged dispersion liquid may be again supplied in a container 2 from an inlet port 6 if needed (it is called circulation supply), and two or more pin mold mills 1 are arranged to a serial multistage, and it may be made to carry out distributed processing of the dispersion liquid one by one.
[0033] Moreover, drawing 3 explains a sand mill as another example of a medium disperser. A sand mill 21 is equipped with the container (bessel) 22 of the shape of a longwise cylinder which contains the dispersion liquid of a magnetic coating, the revolving shaft 24 by which many rotation disks 25 are connected and a rotation drive is carried out by the motor (illustration abbreviation), the inlet port 26 of dispersion liquid established in the container 22, and the outlet 27 of dispersion liquid.
[0034] The rotation disk 25 is constituted by disc-like like drawing 3 (b), and two or more hole 25a is prepared. While the medium for distribution in the bessel of a disperser (bead) receives distributed processing, being agitated with many disks 25 which the dispersion liquid (magnetic coating) sent in from the inlet port 26 with the pump etc. rotate, it is discharged from an outlet 27.
[0035] In addition, you may be other dispersers which have stirring equipment installed inside in the ANYURA mold mill or the mixing chamber besides an above-mentioned pin mold mill and an above-mentioned sand mill as a medium disperser. Stirring equipment may be the disk for stirring, a patagium agitator body, or a pin for stirring, and although there will be especially no constraint if the peripheral speed upsilon is within the limits which satisfies a formula (1), it is 6-12m/second preferably.
[0036] Moreover, although there is especially no constraint in the quality of the material, the medium for distribution

has a desirable ceramic and is more desirable from the point that especially a zirconia is whenever [wear-proof], and what was made into the shape of a bead of a minor diameter is used. The specific gravity of medium rhoa for distribution is 2.0g/cc - 6.5g/cc preferably, and is 3.8g/cc - 6.0g/cc more preferably. The mean particle diameter of the medium for distribution has 1 desirablemm or less, and 0.3mm - its 0.8mm is more desirable. In addition, if the mean particle diameter of the medium for distribution becomes small too much, separation with dispersion liquid and the medium for distribution becomes difficult, and the medium for distribution will leak out in dispersion liquid from a medium disperser, and it will blockade in feeders, such as a gear pump, and will become easy to produce the trouble that normal operation becomes difficult and of causing the trouble on manufacture. Therefore, it is possible to use the medium for distribution of mean particle diameter smaller than that [less than 0.3mm], if separation with the medium for distribution and dispersion liquid is possible, if it is the conditions with which a formula (1) is filled.
[0037] Moreover, 55 - 85% of the filling factor of the medium for distribution is desirable. When the volume of V2 and dispersion liquid is set [the volume of the appearance when throwing in the medium for distribution in a container] to V3 for the true volume of V1 and the medium for distribution, it is defined as a filling factor as 100V1/(V2+V3).
[0038] As magnetic ****, moreover, the solid solution of gamma-Fe 2O3, Fe3O4, and gamma-Fe 2O3 and Fe3O4, The solid solution of Co compound covering mold gamma-Fe 2O3, Co compound dope mold gamma-Fe 2O3, Co compound covering mold Fe 3O4, Co compound dope mold Fe 3O4, and Co compound covering mold gamma-Fe 2O3 and Co compound covering mold Fe 3O4, The solid solution of Co compound dope mold gamma-Fe 2O3 and Co compound dope mold Fe 3O4, The oxide ferromagnetic powder of CrO2 grade, a Fe-Co-nickel alloy, a Fe-aluminum alloy, A Mn-Bi alloy, a Fe-aluminum-P alloy, a Fe-Co-nickel-Cr alloy, Conventionally well-known metal magnetism powder which uses Fe, nickel, and Co as a principal component, such as a Fe-nickel-Zn alloy, a Fe-Co-nickel-P alloy, a Fe-nickel alloy, a Co-nickel alloy, a Co-P alloy, a Fe-Mn-Zn alloy, and a Fe-nickel-Cr-P alloy, is mentioned.
[0039] Moreover, as a resin ingredient as a binder, there are a vinyl chloride-vinyl acetate system copolymer, a vinyl chloride-salt vinylidene copolymer, cellulose system resin, epoxy system resin, polyester system resin, polyurethane system resin, polyvinyl-butyral system resin, fibrin system resin, synthetic-rubber system resin, etc., and these are the resin ingredients as a binder generally used for magnetic-recording media.
[0040] moreover, independent [without the organic solvent as a solvent having KISANON, ethyl acetate, a tetrahydrofuran etc. to a methyl ethyl ketone, methyl isobutyl ketone, and toluene cyclo, and these being suitable for dissolving the resin ingredient of a binder, and being restricted especially] -- or it is used by two or more sorts, mixing.

[0041] In addition, a dispersant, lubricant, abrasives, an antistatic agent, a curing agent, etc. are added and used if needed. Generally this is added in a magnetic coating.
[0042] Moreover, as the method of application used in case a magnetic coating is applied and a magnetic layer is formed on thin base materials, such as PET, the extrusion applying method, the reverse roll applying method, a gravure roll coating method, the knife coater applying method, the doctor blade applying method, the kiss coat applying method, the color coat applying method, the slide bead applying method, etc. can be used. Especially, it extrudes in respect of the homogeneity of spreading thickness especially, and the applying method is desirable.
[0043] Moreover, as a base material, it can do using well-known base materials, such as polyester, such as polyethylene terephthalate (PET) and polyethylenenaphthalate (PEN), polyolefines, a polyamide, polyimide, polyamidoimide, polysulfone cellulose triacetate, and a polycarbonate.
[0044]
[Example] Next, the examples 1-7 of this invention are explained with the examples 1-4 of a comparison.
<Example 1> [0045] The pin mold mill as shown in drawing 2 as a medium disperser was used, and it created as an example 1 on condition that the publication to Table 1 of the magnetic coating which has the following presentation.
[0046]
Magnetic coating constituent [0047]
Ferromagnetic metal magnetism magnetism powder (Hc=1850Oe, sigmas=130 emu/g, 0.10 micrometers of average major-axis length) ... The 100 weight sections [0048]
Vinyl chloride system copolymer resin (the Nippon Zeon Co., Ltd. make, MR110) (binder) ... The 8.3 weight sections [0049]
Polyester polyurethane resin (the Toyobo Co., Ltd. make, UR-8300) (binder) ... The 8.3 weight sections [0050]
alpha-alumina (the Sumitomo Chemical Co., Ltd. make, HIT60A) ... 8 weight capital [0051]
Stearin acid ... One weight section Butyl stearate ... One weight section [0052]
Methyl ethyl ketone (solvent) ... The 118 weight sections [0053]
Toluene (solvent) ... The 118 weight sections [0054]
Cyclohexanone (solvent) ... 79 weight sections [0055] After the kneader's having performed magnetic powder and a binder solution and fully performing kneading processing in the state of hyperviscosity in the condition excluding some organic solvents in the above-mentioned constituent, Mixing and distributed processing are performed carrying out

circulation supply of the zirconia beads of 0.8mm of mean diameters in peripheral-speed 6 m/s for 6 hours by the medium disperser (pin mold sand mill) filled up with 80% of filling factors, after adding the remaining organic solvents and fully stirring with a dissolver. Add the 3.3 weight sections in the obtained magnetic coatings, mix a curing agent in them, and the filter of 0.3 micrometers of nominal filtration accuracies performs filtering. The magnetic coating was applied so that the thickness after desiccation of a magnetic layer might be set to 1.2 micrometers on a PET base material with a thickness of 8 micrometers, and magnetic field orientation processing, desiccation processing, and calender surface treatment were performed.

[0056] Moreover, after applying to the opposite side of the magnetic layer side of a PET base material the back coat layer which makes carbon black and a binder a subject and performing calender processing, heat-curing processing was performed.

[0057] The original fabric of the magnetic-recording medium produced as mentioned above was judged to 8mm width of face, and the sample of a tape-like magnetic-recording medium was created.

[0058] Moreover, stirring the dispersion liquid of the magnetic coating before preparing as mentioned above and putting in a curing agent with a storage tank, after 24-hour preservation, it applied by having operated it like the above using this magnetic coating, and the sample was created similarly.

[0059] Evaluation of a filter life and magnetic properties as shown below, and a magnetic parametric performance was performed about the sample created as mentioned above. This result is shown in the next table 1.

[0060]

[Table 1]

	実施例1	比較例1	実施例2	実施例3	実施例4	比較例2	比較例3	実施例5	実施例6	比較例4	実施例7
分散用媒体の種類	ジルコニア	ジルコニア	チタニア	ジルコニア	チタニア	ジルコニア	ジルコニア	ジルコニア	ジルコニア	ジルコニア	ジルコニア
分散用媒体平均粒径r(mm)	0.8	1.25	1	0.3	0.6	0.8	0.3	0.3	0.5	1.25	0.6
分散用媒体比重ρa(g/cc)	6	6	4	6	4	6	6	6	6	6	6
分散溶粘度η(cps)											
一次分散時	3000	3000	3000	3000	3000	3000	10000	20000	10000	10000	30000
希釈分散時							2960	3040	3080	3000	3120
分散液比重ρb(g/cc)											
一次分散時	1.2	1.2	1.2	1.2	1.2	1.2	1.22	1.22	1.22	1.22	1.24
希釈分散時							1.2	1.2	1.2	1.2	1.2
分散機周速u(m/s)	6	6	6	6	6	10	6	12	12	6	12
式(1)の値											
一次分散時	1.08	0.28	1.42	20.48	0.68	0.39	68.66	34.27	3.70	0.95	11.16
希釈分散時							20.20	5.19	1.14	0.28	1.15
分散後塗布											
角形比	0.86	0.81	0.85	0.84	0.86	0.82	0.83	0.85	0.86	0.82	0.87
7.6MHz出力(dB)	0.7	0.3	0.6	0.5	0.6	0.5	0.3	0.6	0.7	0.5	0.8
フォルターライフ(hr)	30	36	32	26	31	38	5	29	32	30	30
24hr静置後塗布											
角形比	0.85	0.77	0.85	0.84	0.85	0.79	0.82	0.84	0.86	0.79	0.86
7.6MHz出力(dB)	0.6	-0.2	0.6	0.5	0.5	0	0.3	0.5	0.7	0.1	0.7

In addition, magnetic measurement was performed by impression field 10KOe, using Toei Industry VSM as magnetic properties, the remanence ratio (Br/Bm) was measured, and this remanence ratio estimated magnetic properties.

[0061] Moreover, as a magnetic parametric performance, the playback output of a record signal with a wavelength of 7.6MHz was measured with the Hi8 deck (EV-S9000 by Sony Corp.), and this 7.6MHz output (dB) estimated the magnetic parametric performance.

[0062] <Example 1 of a comparison> The sample was created like the example 1 except having set to 1.25mm mean particle diameter of the medium for distribution used as an example 1 of a comparison again.

[0063] <Example 2> The sample was created like the example 1 except having used the medium for distribution to be used as the titania bead whose mean diameter of the is 1.0mm and whose specific gravity is 4.0g/cc again.

[0064] <Example 3> The sample was created like the example 1 except having set mean particle diameter of the medium for distribution to be used to 0.3mm again.

[0065] <Example 4> The sample was created like the example 1 except having used the medium for distribution to be used as the titania bead whose mean diameter of the is 0.6mm and whose specific gravity is 4.0g/cc.

[0066] <Example 2 of a comparison> The sample was created like the example 1 except having made peripheral speed of the medium disperser to be used into 10 m/s.

[0067] <Examples 5-7 and examples 3 and 4 of a comparison> in the condition except some organic solvents of an above-mentioned magnetic coating constituent After a kneader fully performs kneading processing, with the peripheral speed of the medium for distribution of the conditions shown in Table 1, and a medium disperser as examples 5-7 and examples 3 and 4 of a comparison Carrying out circulation supply for 5 hours, after adding the remaining organic solvents and mixing so that it may become the viscosity (at the time of primary distribution) shown in Table 1, respectively, perform mixing and distributed processing and it considers as the magnetic coating of primary distribution. Furthermore, it carried out mixing and distributed processing, and considered as the magnetic coating after diluent powder, diluting [added the organic solvent, mixed and] and carrying out circulation supply for 1 hour so that it may become the viscosity (at the time of diluent powder) shown in Table 1, respectively, and each magnetic coating (dispersion liquid) was prepared, respectively. Each sample of examples 5-7 and the examples 3 and 4 of a comparison was produced as mentioned above.

[0068] If an example 1 is compared with the example 1 of a comparison and the mean particle diameter of the medium for distribution will exceed 1mm, the value of the middle term of a formula (1) will become less than 0.5 from the result shown in Table 1, both a remanence ratio and a playback output are low, and magnetic properties and a magnetic parametric performance fall, and the magnetic parametric performance after storage is falling, and it turns out that keeping is not good.

[0069] Moreover, according to the example 2, compared with the example 1, mean particle diameter of the medium for distribution is enlarged with 1mm, and specific gravity is made small with 4, but the value of the middle term of a formula (1) is 40 or less [0.5 or more], and it turns out that a remanence ratio and a playback output hardly changed, and magnetic properties and a magnetic parametric performance did not fall, and keeping is stable.

[0070] Moreover, according to the example 3, although mean particle diameter of the medium for distribution is made small with 0.3mm compared with the example 1, the value of the middle term of a formula (1) is 40 or less [0.5 or more], and it turns out that a remanence ratio and a playback output hardly changed, and magnetic properties and a magnetic parametric performance did not fall, and keeping is stable.

[0071] Moreover, according to the example 4, compared with the example 1, mean particle diameter of the medium for distribution is made small with 0.6mm, and specific gravity is made small with 4, but the value of the middle term of a formula (1) is 40 or less [0.5 or more], and it turns out that a remanence ratio and a playback output hardly changed, and magnetic properties and a magnetic parametric performance did not fall, and keeping is stable.

[0072] Moreover, when the example 1 of a comparison which made peripheral speed of the churning equipment of an example 1 and a medium disperser large in 10m/[a second and] is compared, the value of the middle term of a formula (1) is less than 0.5, and especially, the playback output after a 24-hour reservoir is low, and it turns out that keeping is not good in respect of a magnetic parametric performance.

[0073] Moreover, since the viscosity at the time of primary distribution is high and the value of the middle term of a formula (1) is 40 or more when an example 3 is compared with the example 3 of a comparison, it turns out that a playback output is low, the filter life is falling further, and magnetic powder is not fully distributing in magnetic coatings even if the viscosity at the time of diluent powder becomes 40 or less low.

[0074] Moreover, when examples 5-7 are compared with the example 4 of a comparison, and the viscosity at the time of primary distribution is high, it turns out that the value of the middle term of a formula (1) becomes 40 or less [0.5 or more] by enlarging peripheral speed of the churning equipment of a medium disperser, and sufficient magnetic properties, a magnetic parametric performance, and keeping can be acquired.

[0075] as mentioned above, ****** which makes the value of the middle term of a formula (1) within the limits of this invention so that clearly from each result of examples 1-7 and the examples 1-4 of a comparison -- since according to the slanting manufacture approach the life of a filter can be lengthen while the storage stability which was excellent when atomization and the magnetic powder formed into high magnetic energy were used is securable, the productivity of a magnetic coating and a magnetic-recording medium can be improve. Moreover, according to the magnetic record medium manufactured using the magnetic coating obtained by this manufacture approach, magnetic properties and a magnetic parametric performance are improved, and the possible magnetic-recording medium of high density record becomes realizable.

[0076] Although the gestalt of operation explained this invention as mentioned above, this invention is not limited to these and various kinds of deformation by within the limits of the technical thought of this invention is possible for it. For example, as long as the medium for distribution is range with which are satisfied of the value of the middle term of a formula (1), it may use other quality of the materials and the thing of mean particle diameter.

[0077]

[Effect of the Invention] According to this invention, when atomization and the magnetic powder formed into high magnetic energy are used, the manufacture approach that the magnetic coating which fits high density record by the medium for distribution of a minor diameter by high specific gravity can be manufactured can be offered. Moreover, it manufactures using this magnetic coating, magnetic properties and a magnetic parametric performance are raised, and

the possible magnetic-recording medium of high density record can be offered.

[Translation done.]